

ABSTRACT

We have undertaken a search for variable stars in the metal-rich globular cluster NGC 6441 using time-series BV photometry. The total number of variables found near NGC 6441 has been increased to ~ 104 , with 48 new variables being found in this survey. A significant number of the variables are RR Lyrae stars (~ 46), most of which are probable cluster members. As was noted by Layden et al. (1999), the periods of the fundamental mode RR Lyrae are unusually long compared to field stars of similar metallicity. The existence of these long period RRab stars is consistent with Sweigart & Catelan's (1998) prediction that the horizontal branch of NGC 6441 is unusually bright. This result implies that the metallicity-luminosity relationship for RR Lyrae stars is not universal. We discuss the difficulty in determining the Oosterhoff classification of NGC 6441 due to the unusual nature of its RR Lyrae. A number of ab-type RR Lyrae are found to be both brighter and redder than the other probable RRab found along the horizontal branch, which may be a result of blending with stars of redder color. A smaller than usual gap is found between the shortest period fundamental mode and the longest period first-overtone mode RR Lyrae. We determine the reddening of the cluster to be $E(B-V) = 0.51 \pm 0.02$ mag, with substantial differential reddening across the face of the cluster. The mean V magnitude of the RR Lyrae is found to be 17.51 ± 0.02 resulting in a distance of 10.4 to 11.9 kpc, for a range of assumed values of $\langle M_V \rangle$ for RR Lyrae stars. The possibility that stars in NGC 6441 may span a range in $[\text{Fe}/\text{H}]$ is also discussed.

Subject headings: Stars: variables: RR Lyrae stars; Galaxy: globular cluster: individual (NGC 6441)